

A4.3 GUIDE SIGN DESIGN AND GENERAL PLACEMENT

A4.3.1 Importance of Common Standards

The application of technical standards for design, manufacture and installation of signing is necessary to ensure that:

- Signs are of a consistent colour and shape for ease of recognition.
- Legend size is the optimum for motorist comprehension at the posted traffic speed.
- The use and number of words and symbols is optimized for maximum information and comprehension.
- Signs do not present a safety hazard.

Alberta Infrastructure and Transportation has patterns with sizes of symbols, borders, colours, layouts, arrows, font sizes and types preset for many common signs. These should be used without exception. The following section is provided for signs where the patterns cannot be used.

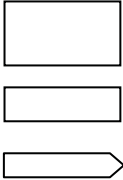
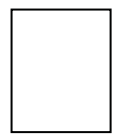
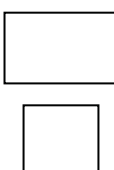
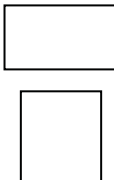
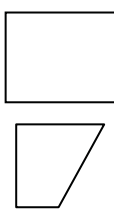
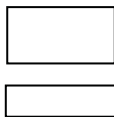
The design of guide and information signs has several components:

- Shape and Colour
- Font Type
- Font Size
- Borders
- Abbreviations
- Symbols
- Arrows
- Sign Layout
- Sign Size
- Placement Considerations
- Sign Materials.

A4.3.2 Shape and Colour

The shape and colour of a sign advises the road user of the class of message before they get close enough to the sign to read the message. The recognition of signs can be simplified by enabling the driver to judge in advance the type of message expected, and to help in this regard a code of shapes and colours is adopted. Table 3.1 illustrates the shapes and colours for each sub-class of guide and information sign.

Table 3.1 – Guide and Information Sign Shapes and Colours

Class	Sub-Class	Shape	Colour Code			Comments
			Back-Ground	Message	Border	
Guide and Information	IA Destination Guide Signs		Green	White	White	Used for providing direction and distance to communities and large trip generators.
	IB Route Markers & Trail Blazers		White Variable	Black Variable	Black Variable	Used primarily for route identification. Trail Blazers may contain other custom colours.
	IC Off Road Facility Signs		Blue	White	White	Some municipalities may choose to use a brown background for roadside facilities. Some messages may also contain minor elements in other colors.
	ID Miscellaneous Information Signs		Green	White	White	Some miscellaneous signs also have elements in other colours.
	IF Freeway Guide Signs		Green	White	White	Used for providing direction and distance to exit ramps along freeways
Tabs	Supplementary Information Panels		Colours should match the primary sign onto which the tab is attached.			

A4.3.3 Font Type

It is important that clear and consistent font types be used on all guide signs.

The Clearview font style, which includes the ClearviewHwy font, was developed through a decade of research starting in the early 1990s. The goal of the Clearview font was to increase legibility and reduce halation of highway sign legends in comparison to that of Standard Highway Signs (SHS) Alphabets (Highway Gothic font).

Clearview font letters were developed specifically to address four issues with the legibility of SHS alphabets. They are:

- Upgrade highway signing word messages to accommodate the needs of older drivers without increasing the capital letter height and the overall length and height of word messages and the signs themselves.
- Improve word pattern recognition by using mixed case words of the same size composed of lower case letters designed for highway sign applications.
- Improve the speed and accuracy of destination recognition and the legibility distance of word messages.
- Control or minimize the halation of words displayed on high brightness retroreflective materials for drivers with reduced contrast sensitivity.

The term ClearviewHwy font will be used to reference the Clearview type system that has the six distinct weights, with each having a version for positive contrast applications. ClearviewHwy font software is available from the developer of the Clearview font type system. For further information on the

ClearviewHwy font, please refer to the website: clearviewhwy.com

A general comparison guide for application to the SHS Standard Alphabet is summarized in the following table:

Table 3.2 – Comparison of ClearviewHwy Font to Highway Gothic Font

ClearviewHwy Font	Highway Gothic Font
1-W	Series B
2-W	Series C
3-W	Series D
4-W	Series E
5-W and 5-W-R*	Series E-Modified
6-W	Series F

* ClearviewHwy 5-W-R has tighter letter spacing than 5-W and is designed for the replacement of overhead guide signs in which the 5-W is too wide for the specific application.

Key changes to the department practice for Standard Highway Signs Alphabets (Highway Gothic font) for guide signs shall be as follows:

- All new overhead and shoulder-mounted guide signs shall adopt the ClearviewHwy font type system. Guide signs that previously applied the SHS Series E shall utilize ClearviewHwy 4-W. Guide signs that previously applied the SHS Series E-Modified shall utilize the ClearviewHwy 5-W.
- The character spacing of Clearview font shall follow the spacing tables for ClearviewHwy, and not SHS E-modified. However, for overhead guide signs and for the replacement of existing guide signs where the 5-W is too wide for the specific application, the 5-W-R font may be used.
- All guide signs shall be designed with the ClearviewHwy font type system software.

If the message on the guide sign does not fit on the sign due to restricted sign space then a narrower series font may be used to condense the message. One line of text, within a two or three line text message, may be reduced, but not by more than one font series. Reducing the font by more than one font series would cause the smaller text to look out of place.

Facility and attraction signs belonging to Class IC typically use 3-W font, unless its placed on a multilane highway where 5-W font is used. Motorists can more easily distinguish between primary destinations such as communities and secondary destinations belonging to individual attractions and facilities. 2-W font may be used to condense long messages or on smaller tab sized signs.

Destination names placed on guide signs shall use lower case letters with uppercase as the initial letter (Initcap). All other text (NORTH cardinal direction, NEXT EXIT, EXIT ONLY, etc.) is given in uppercase letters only.

A4.3.4 Font Size

In order for a sign to be effective, it must be legible from a distance which allows a driver to read it, react to it and carry out any required maneuvers before reaching the sign.

TAC's *"Supplemental Guide for Guide and Information Signage in Canada"* and AASHTO's *"Manual of Uniform traffic Control Devices"* states that for every 12 m of desired legibility, 25 mm of text is needed. An example is provided in Section A4.2.3.3 showing how letter height is derived based on desired legibility.

For guide and information signs, Table 3.3 should be used to determine the letter heights on signs on urban roadways and Table 3.4 should be used on rural roadways. Font sizes are given for several different types of messages. In fringe areas of cities the urban standard is typically used, because of higher volume and the expectancy that these highways will become urbanized.

Table 3.3 – Letter Sizes for Overhead and Ground Mounted Urban Freeway Guide Signs

Message Detail	Urban Freeway & Expressway mm (inches)		Arterial mm (inches)		Collector Road & Service Road mm (inches)	Interchange Ramp & Access Road mm (inches)
	Overhead	Ground Mount	Overhead	Ground Mount	Ground Mount	Ground Mount
Main Destination / Name (i.e. Community Name, Route Name, Cross Street, Major Airport)	406 (16")	330 (13")	330 (13")	254 (10")	254 (10")	254 (10")
Secondary Information (i.e. Shopping Centre, Zoo, Stadium, Other Major Trip Generator)	330 (13")	-	254 (10")	-	-	-
Cardinal direction	330 (13")	254 (10")	254 (10")	203 (8")	203 (8")	203 (8")
Distance units (i.e. "km", "m")	330 (13")	254 (10")	254 (10")	203 (8")	203 (8")	203 (8")
Exit number	330 (13")	254 (10")	-	-	-	-
Route number in shield	330 (13")	254 (10")	254 (10")	203 (8")	203 (8")	203 (8")
Notes:						
1. For complex situations where there are non-standard offset distances, clearance heights or large messages, refer to the TAC Supplemental Guide for Guide and Information Signage in Canada.						

Table 3.4 – Letter Sizes for Overhead and Ground Mounted Rural Freeway/Highway Guide Signs

Message Detail	Overhead Major Corridor* mm (inches)	Overhead mm (inches)	Ground Mount Multi-Lane mm (inches)	Ground Mount 2-Lane mm (inches)
Main Destination / Name (i.e. Community Name, Route Name, Cross Street, Major Airport)	406 (16")	330 (13")	254 (10")	203 (8")
Secondary Information (i.e. Shopping Centre, Zoo, Stadium, Other Major Trip Generator)	330 (13")	254 (10")	203 (8")	152 (6")
Cardinal direction	330 (13")	254 (10")	203 (8")	152 (6")
Distance units (i.e. "km", "m")	330 (13")	254 (10")	203 (8")	152 (6")
Exit number	330 (13")	254 (10")	203 (8")	152 (6")
Route number in shield	330 (13")	254 (10")	203 (8")	152 (6")
Notes:				
1. For complex situations where there are non-standard offset distances, clearance heights or large messages, refer to the Supplemental Guide for Guide and Information Signage in Canada.				

* Major corridors include rural highways on the National Highway System within Alberta. Examples include North/South Trade Corridor, Trans Canada Highways, and route from Edmonton to Fort McMurray.

A4.3.5 Borders

A border having the same colour as the text message shall be placed at the perimeter of all guide and information sign panels to increase the sign's conspicuity and provide an overall finished appearance. The border shall be extended to the edge of the sign panel with no background colour shown between the border and the edge. The border thickness and radius of curvature for the corners is shown in Table 3.5.

Table 3.5 – Border Sizes

Maximum Letter Height mm (inches)	Border Thickness mm (inches)	Outside Corner Radii mm (inches)
150 (6")	19 (0.75")	100 (4")
203 (8")	19 (0.75")	100 (4")
254 (10")	19 (0.75")	100 (4")
305 – 330 (12" – 13")	38 (1.5")	150 (6")
406 (16")	50 (2")	200 (8")
Notes:		
(1) Borders shall extend to the perimeter edge of the sign panel.		
(2) Border thickness shall not exceed the stroke width of the major lettering on the sign.		
(3) The border corner radii should be measured to the outside edge of the border.		
(4) The corner radius should not exceed 1/8 of the width or height, whichever is less.		
(5) Trimming the sign area outside the corner radius is not required.		

A4.3.6 Abbreviations

Abbreviations may be used to reduce message length if needed or to balance the message over the face of the sign. The unabbreviated version shall be used if there is sufficient space. Abbreviations should be used with care, ensuring that only commonly used and understood abbreviations are utilized for signs. Periods are used after abbreviations for any type of roadway (i.e. Freeway, Road,

Highway, Boulevard and Junction). Periods are not used when abbreviating lengths or directions and after the abbreviations for Range and Township Roads. In Alberta, the following abbreviations (with and without periods) are recognized.

Table 3.6 – Standard Abbreviations

Word Message	Standard Abbreviation
Avenue	Ave.
Drive	Dr.
Freeway	Fwy.
Highway	Hwy.
Trail	Tr.
Boulevard	Blvd.
Road	Rd.
Street	St.
Junction	Jct.
kilometre(s)	km
metre(s)	m
Township Road	TWP RD
Range Road	RGE RD
Southwest	SW
Southeast	SE
Northwest	NW
Northeast	NE

A4.3.7 Symbols

Symbols have an advantage over word messages in that they can be seen and recognized from greater distances. If the symbols are easily recognizable, either because of their standard application across the country or because they are self explanatory, they can be understood more quickly than a word message and even by people who do not understand the English language. In order to be effective, therefore, symbols must be understood by a large percentage of the population. Consequently, when designing new symbols, the design

should be thoroughly tested by a sample of representative drivers, rather than just other designers and traffic practitioners. Symbol designs should be kept simple and the elements of a symbol kept as large as possible, as small elements on a symbol cannot be distinguished at large distances. A number of recognized Alberta symbols, which may be recognized by national and international travelers, are provided on the Alberta Infrastructure and Transportation website, and the designer should check the Sign Panel Catalogue for newly developed symbols. Any symbol used on signs must be identical in design to those shown in the Sign Panel Catalogue.

A4.3.8 Arrows

There are several types of arrows used in guide signs to provide directions of travel.

These include:

- **Tapered Shafted Arrows** – these are up, left, right or angled on directional signs.
- **Straight Shafted Arrows** – these are up, left or right on community direction signs.
- **Down Arrows** – these are only used on overhead signs in a downward direction to show lane designation.
- **Tab Arrows** – these are used on tab signs.

4.3.8.1 Tapered Arrows

Tapered arrows should be used in an up or angled direction to provide a direction of travel for the driver on both ground mounted directional exit and overhead guide signs. The actual size of this arrow depends upon the height of the letters, as shown in Table 3.7. The shaft length should be within the dimensions provided, dependent upon the amount and number of rows of text. The

taper rate on the shaft of the arrow should be kept constant. The tapered arrow is illustrated in Figure 3.1.

Figure 3.1 – Tapered Arrow Dimensions

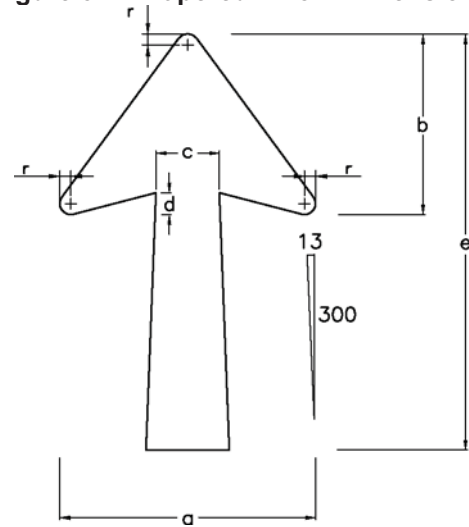


Table 3.7 – Tapered Arrow Dimensions

Letter Height (Upper Case)	Arrow Dimensions in mm					
	a	b	c	d	e*	r
205	385	300	95	35	430 – 635	20
255 – 340	465	330	115	40	510 – 760	20
405	565	430	135	45	635 – 890	25

Notes:
1. Taper of 13 mm per 300 mm should be held constant for all shaft lengths

* Dependent on letter size.

Slanted arrows are typically inclined at 45° or 60° from horizontal. The 60° slanted arrow is used when the tapered arrow is placed on the left or right side of the sign panel. The 45° arrow is used when the arrow is placed on a row in the center of the sign panel.

4.3.8.2 Straight Shafted Arrows

The dimensions of the straight shafted arrow are shown in Figure 3.2 and Table 3.8.

Figure 3.2 – Straight Shafted Arrow Dimensions

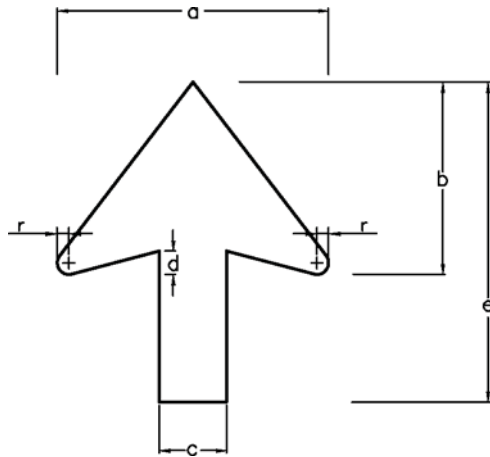


Table 3.8 – Straight Shafted Arrow Dimensions

Letter Height (Upper Case)	Arrow Dimensions in mm					
	a	b	c	d	e*	r
203	203	170	64	17	250	14
254	254	213	80	21	300	17

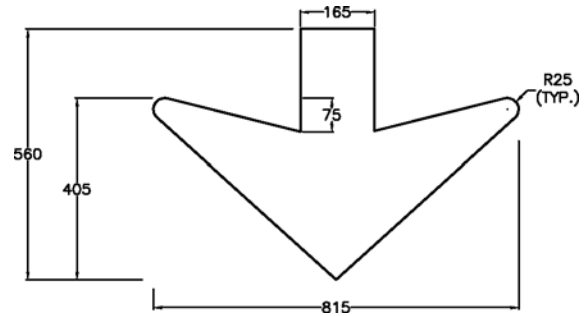
* Increase stem length by 50 mm for left and right arrow placed in the horizontal position

These arrows are used horizontally pointing in either direction, or vertically to indicate the road ahead on community direction signs. See Section A4.5 for examples of how these arrows are used in signs.

4.3.8.3 Down Arrows

Down arrows are used to show specific traffic lanes on overhead signs (often referred to as “Pull Thru” signs). Figure 3.3 indicates a standard size for the down arrow used on overhead signs.

Figure 3.3 – Down Arrow Dimensions



Down arrows located on overhead signs should be placed in the middle of the lane but may be aligned between the 1/4 point and the 3/4 point in the lane if necessary. Multiple down arrows should be placed at a consistent spacing.

In locations where four or more down arrows are required, and there are no exit only lanes approaching the ramp, wording may be used in lieu of the down arrows (i.e. “4 Lanes” instead of four down arrows). This will reduce the number of sign panels placed over each lane. Examples of these applications are provided in Figures 3.4 to 3.6.

Figure 3.4 – Down Arrow Placement on Sign for Two Lanes

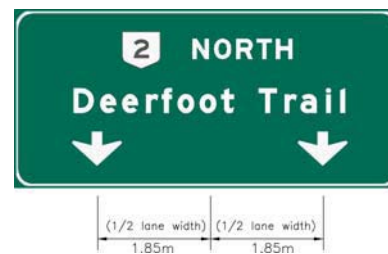


Figure 3.5 – Down Arrow Placement on Sign for Three Lanes

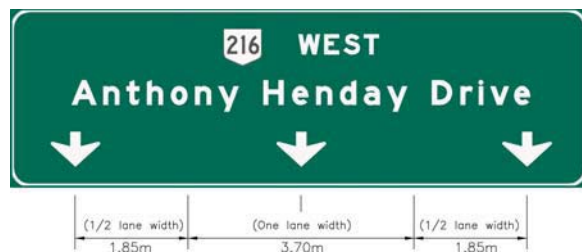


Figure 3.6 – Specific Traffic Lane (more than three lanes)



4.3.8.4 Tab Arrows

Tab arrows are used on tab signs below route markers. These types of arrows are illustrated in Section A4.4.

A4.3.9 Sign Layout

Many signs have standard patterns with pre-defined parameters such as size, dimensions, letter sizes, etc. Others (and in particular guide signs), require a custom design dependent upon the individual message being displayed. The following are guidelines for the layout of those signs:

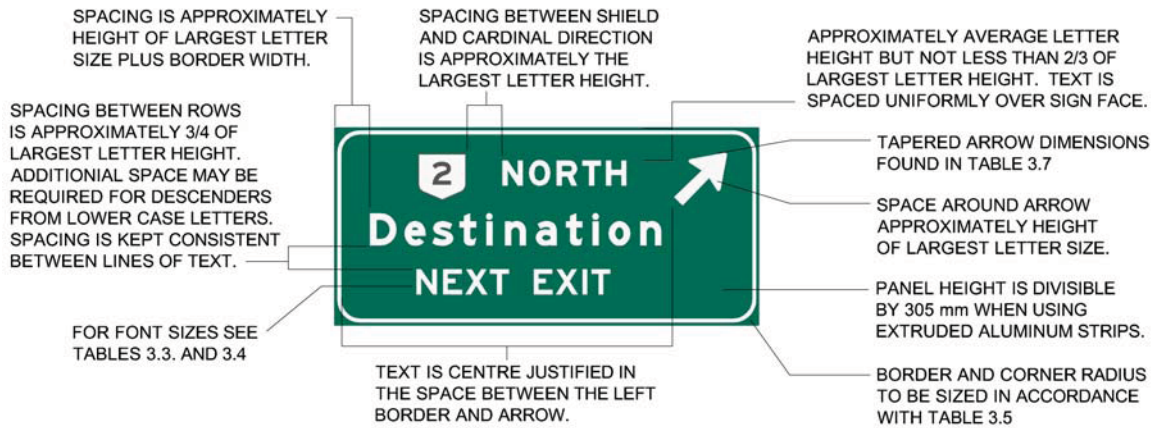
- Text and/or symbols should be ordered logically and balanced over the face of the sign.
- The spacing between lines and text should be such that the sign is legible from a distance.

- The spacing between lines for mixed case text should be increased, so that the vertical strokes down below the line do not interfere with the upward strokes of the text below.
- A border should always be used.
- Lots of background should always be used to make the sign message clearly distinguishable.

It is important to note that extruded aluminum (which is used for the guide sign backing material) is manufactured in 305 mm (12") strips. The size of the sign and the size of the spaces between the rows of a message should be designed so that the total sign depth is an equal increment of 305 mm wherever possible. Full panel widths should be used as cutting the aluminum strips into narrower pieces is not desirable.

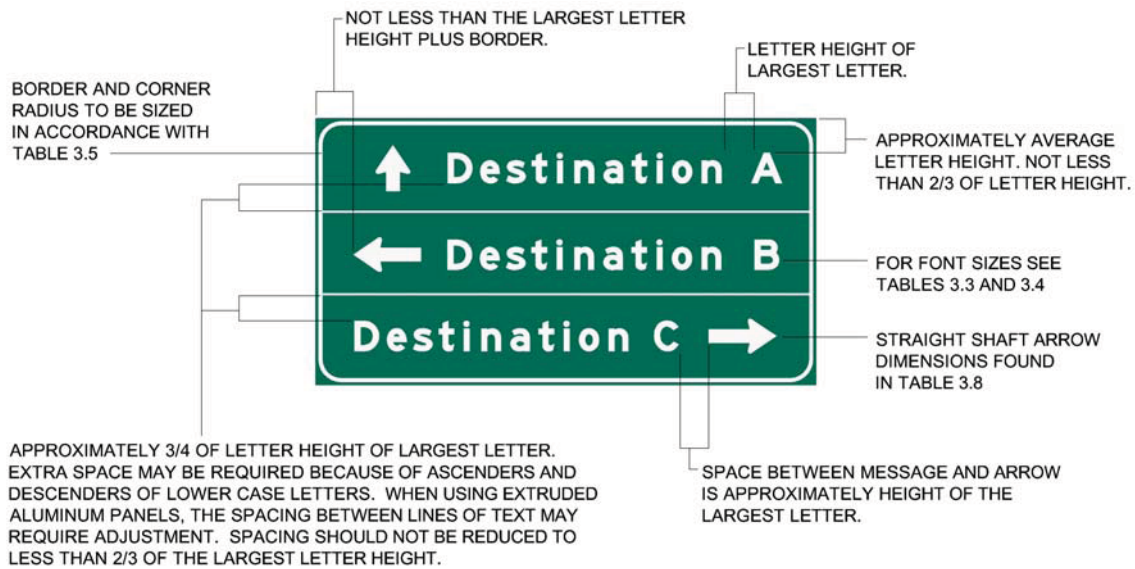
In general, guide and information signs should be laid out according to Figures 3.7 and 3.8, with spacing above and below the message.

Figure 3.7 – Typical Layout of an Exit Guide Directional Sign



NOTE: SOME FINAL ADJUSTMENT OF THE ABOVE DESIGN ELEMENTS MAY BE REQUIRED TO GIVE THE SIGN AN OVERALL BALANCED APPEARANCE

Figure 3.8 – Destination Direction Sign Layout



NOTE: THE SAME CRITERIA IS APPLIED TO A COMMUNITY DISTANCE SIGN AND COMMUNITY DIRECTIONAL/DISTANCE SIGN, AS OUTLINED IN SECTION A4.5.11 TO A4.5.13

A4.3.10 Sign Size

The size and amount of lettering is very important in sign design. The size of the sign shall be dependent upon the size of lettering required and the length of the message. The length of the message should be kept as short as possible. Signs should be sized to adequately fit the message in accordance with the sign layout guidelines provided above. Signs and Messages should be larger if:

- There are factors that impact the driver, such as a complex driving environment in an urban situation.
- In areas with a high collision rate, where the collisions can be attributed to drivers missing the sign.
- If there is a known challenged-driver population in the area.

Under certain circumstances, in city centres for example, the locations for installing signs of a certain size may be limited by boulevard space and structural limitations of the sign support structure. In these cases, it may be necessary to either redesign the sign or divide sign information over two or more signs. Other locations on highways may also have sign size restrictions such as overhead structures over travel lanes, and on exit ramps. In areas with restricted clearances the height of sign may also be restricted.

A4.3.11 Placement Considerations

Proper positioning of signs is an important element in the overall control of traffic within a roadway network. When carefully planned and applied, it significantly improves the driver's ability to navigate through the network. Conversely, when neglected it may contribute to operational and safety problems.

Consequently, it is important to standardize the position of signs so the drivers can quickly

locate them and spend more time reading the signs rather than looking for them.

Due to the changing roadway environment, the standardization of sign position is not always attainable. As a general rule, signs should be placed in the most advantageous position and adapted to the road design and alignment.

The following guidelines should be used when locating traffic signs and devices along a roadway.

A4.3.11.1 Ground Mounted versus Overhead Sign Structures

Ground Mounted Signs - Ground mounts are used for the majority of signs in Alberta. They are reasonably economic and consistent in appearance and placement.

Guide signs are normally installed on the right side of the road, as this is where the driver expects to see them. However, under certain circumstances, signs can be mounted at other locations when it is beneficial to do so. These locations can include:

- In the median to increase conspicuity.
- On the left hand side of the road if there is a sharp right turn.

Overhead Signs - Overhead signs are used on freeways, expressways and major arterials where there are many lanes of traffic, sightline issues, or where the sign needs to be seen from a far distance. They are not normally installed on two-lane highways. Overhead signs may be installed on a bridge type structure or cantilever.

There are many situations where overhead sign structures may be beneficial:

- Traffic volumes at or near capacity.
- Complex interchange design.

- Collision experience indicates drivers having difficulty seeing the primary sign.
- Three or more lanes in each direction.
- Restricted sight distance.
- Closely spaced interchanges.
- Multi-lane exits.
- Left hand exit.
- High percentage of trucks.
- Background street lighting.
- High speed of traffic.
- Consistency of sign message location through a series of interchanges.
- Insufficient space for ground-mounted signs.
- Junction of a major route with another freeway.

The existence of one or more of these conditions does not automatically justify the use of overhead signs. Some of the noted elements may be made less critical by close coordination between design and operation.

Overhead sign supports, should not be installed in gore areas or other exposed locations.

A4.3.11.2 Longitudinal Placement

The distance of a guide sign from an intersection is dependent upon the reading reaction and maneuver time and the resultant decision sight distance. Details of the distances of signs at intersections and interchanges are provided in the TCS Drawings in Sections A4.4 and A4.5. When all the information required by the driver cannot be placed on a single sign or on a number of signs at one location, a longitudinal separation of 100 to 150 m between sets of basic signs is required for all rural areas and 50 to 100 m for urban arterials and freeways. If the guide signs contain more than basic information then the distance between them

becomes a function of the amount of information that the driver must read and absorb, and must be increased.

A4.3.11.3 Horizontal Placement

The horizontal distance of the sign from the edge of the traveled way must trade off the safe clearance distances (and whether the sign is mounted on breakaway posts), with providing optimal sign legibility. For rural roadways the horizontal distance from the white shoulder line to the sign shall be six metres. Horizontal placement of signs on a rural roadway is illustrated in Drawing TCS-A4-300. In urban situations the horizontal offset must not be less than 0.3 m and not more than two metres from the edge of curb. Refer to Drawing TCS-A4-305 (for placement on an urban roadway). Ground mounted sign structures should be placed outside the clear zone whenever possible. Sign structures within the clear zone must be designed with crashworthy materials or breakaway if impacted by an errant vehicle or alternatively protected with an appropriate barrier. For more details regarding the clear zone concept reference is made to the Alberta Infrastructure and Transportation publications "*Highway Geometric Design Guide*" and the "*Highway Lighting Guide*".

A4.3.11.4 Vertical Placement

The general guidelines for the vertical placement of signs are also provided in typical signage Drawings TCS-A4-300 and TCS-A4-305, with additional information shown in Table 3.9.

A4.3.11.5 Guidelines for Sign Installation

Normally, signs should be installed on separate posts except where a second sign is needed to supplement the primary sign or where route or directional signs must be

grouped. Sign posts and their foundations should be able to hold signs rigidly in their proper and permanent position.

Rural Areas

In rural areas, signs are normally installed on a single 100 x 100 mm wooden post. In regions where strong winds are a problem, signs may be installed on a single 100 x 150 mm wooden post. For larger installations, post requirements must be determined based on the following criteria:

- Two posts are needed if the sign width exceeds 150 cm.
- Breakaway ground mounts are needed if the sign area exceeds three square metres (signs located outside the clear zone or protected by a guardrail do not need breakaway supporting structures).
- Signs greater than 5.5 m in width requires a three post mounting.

Urban Areas

In urban areas, signs should preferably be installed on existing roadway appurtenances (such as street light and power poles) to minimize the number of poles along the road.

Separate sign supports, if needed, should be installed as not to create a hazard to cyclists, motorcyclists, pedestrians and drivers. If used, rigid metal posts are more appropriate than wood posts because they can better withstand the impact when struck by an errant vehicle. They are also easier to replace, if needed.

In urban areas the use of posts may be minimized by co-mounting two or more signs on one post (where logical and practical). The criteria for mounting large ground mounted and overhead signs are the same as the criteria for mounting signs along rural highways.

Table 3.9 – Vertical Placement of Signs

Type	Local Characteristics	Recommended Vertical Mounting
<p>Ground Mounted</p>	<p>Areas with pedestrians.</p>	<p>Two metres measured from ground elevation at the base of the signpost to the bottom of the sign, including supplemental tabs (if present). If two metres mounting height is not possible, sign should not be mounted more than three metres from the ground.</p>
	<p>Areas with no pedestrians with raised curbs.</p>	<p>Two metres measured from the road surface to the bottom of the principal sign, regardless of the presence of a tab, to the top of curb. If two metres mounted height is not possible, range of permissible mounting heights is 1.5 to 2.5 m.</p>
	<p>Single guide sign on high speed road.</p>	<p>2.1 m measured from the road surface to the bottom of the sign.</p>
	<p>Guide sign with secondary guide sign mounted below, on high speed road.</p>	<p>2.4 m measured from the road surface to the bottom of the primary sign. 1.5 m from the near edge of the nearest traffic lane to the bottom of the secondary sign.</p>
<p>Overhead</p>	<p>On structures such as traffic signal mast arms, bridge supports, etc.</p>	<p>Clearance requirements are 5.8 m but may need to be increased in areas having over height loads.</p>
	<p>On dedicated overhead support such as a sign gantry.</p>	<p>Clearance requirements are six metres from the roadway surface to the bottom of the sign assembly, including tabs. This separation distance is recommended to reduce the probability of the sign being struck, recognizing the safety implications if the gantry were to collapse on the roadway, as per the Alberta Infrastructure and Transportation bridge clearance requirements.</p> <p>In high load corridors (for loads up to nine metres high) a side mounted or cantilever swivel base is used as a sign structure having a nine metres clearance is impractical.</p> <p>For overhead sign bridges (defined as a structure containing a sign area greater than four square metres), tubular pole structures and cantilever sign structures, the require clearance is six metres.</p>
<p>Notes:</p> <ol style="list-style-type: none"> Site specific conditions may warrant greater separation distances. All signs should be placed to allow for a clear sight line over parked vehicles, or alternatively, parking should be banned. 		

A4.3.11.4 Sign Orientation

Sign orientation should take into account:

- The potential for glare from the vehicle headlights reflecting off the sign face.
- The reflectivity level of the sign provided during night time conditions.
- Driver line of sight relative to the sign, at the point which the sign is first read.

Angling ground-mounted and overhead signs slightly away from the approaching driver reduces glare caused by reflection from headlights at night. Tilting a sign away from the driver also has the negative effect of decreasing sign legibility by increasing the angle of incidence of the light emitted by the headlights. As a result, less light is reflected by the retro-reflective sign sheeting and the sign loses brightness, conspicuity and legibility.

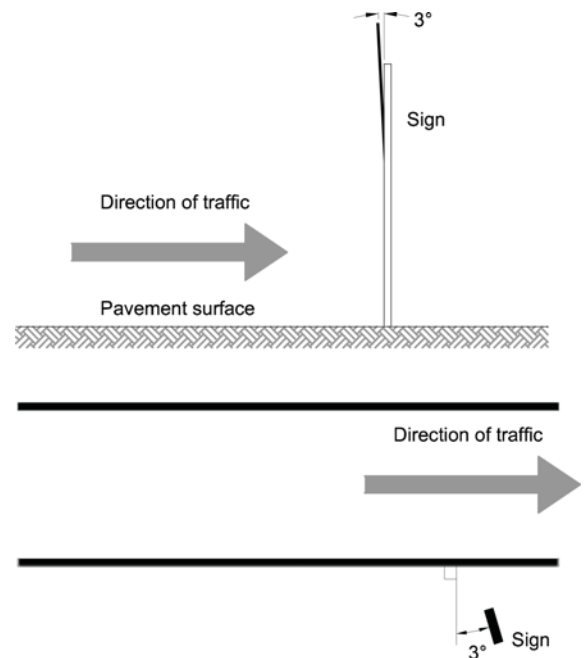
For small side-mounted signs mounted closer to the roadway, the benefits of reduced glare are seen to outweigh the disadvantages of slightly decreasing night legibility. Therefore, the angling of ground-mounted signs slightly away from the driver is recommended for these types of signs. For horizontal offset positions of four to nine metres, the need to angle the sign away from the roadway is reduced and should be verified in the field. At horizontal offset distances of greater than nine metres, the sign should be angled toward the travel lanes to improve legibility.

The orientation of ground mounted and overhead guide signs should be measured relative to the direction of traffic at a location from which the sign is to be first read. Specifically, the following should be considered:

- *Horizontal curves* -the orientation of the sign face relative to the traffic direction should be measured from the tangent of the curve at a point where the sign is to be first read.
- *Vertical curves* -the tilt of overhead signs towards the driver should be measured from a line placed at right angles to the roadway surface and should be greater on uphill grades and reduced on downhill grades.

Exact orientation of a ground mounted sign face should be measured in the field. In general, ground mounted signs should be angled approximately one to three degrees from the perpendicular, away from the traveled direction. The tilt of overhead signs should be towards the ground. Sign orientation is illustrated in Figure 3.9.

Figure 3.9 – Sign Orientation



A4.3.12 Sign Materials

Good construction and installation of signs is necessary to avoid dangerous situations for

road users, particularly from signs that are too low, have sharp edges or are not designed to collapse on vehicle impact. Specifications for sign materials are found within the *“Alberta Highway Construction Specifications Manual”*, obtainable from Alberta Infrastructure and Transportation’s Head Office or the Alberta Infrastructure and Transportation website.

Sign materials fall into three categories:

- Retro-Reflective Sheeting and Illumination
- Substrates
- Sign Supports.

A4.3.12.1 Retro-Reflective Sheeting and Illumination

The visibility of guide signs at night is facilitated by the use of retro-reflective materials to face the signs. In some cases the signs may also be illuminated.

Retro-reflective sheeting uses the headlights of a vehicle at night to illuminate the sign for the driver by reflecting the light. More light will be reflected to the driver by a higher sheeting type number.

The Alberta Infrastructure and Transportation Specification 5.18 - Supply of Permanent Highway Signs Posts and Bases requires that Types III and IV High Intensity Retro-Reflective Sheeting be used. Types VIII and IX Retro-Reflective Sheeting may be used in lieu of illumination.

The artwork on Logo Signs shall be either silk-screened or comprise of Type III or IV retro-reflective sheeting material with or without cuttable film. Cuttable film is an acrylic film that is transparent and durable. The adhesive used is transparent, pressure sensitive and protected by a removable liner. For more information on retro-reflectivity refer to the

TAC *“Supplemental Guide for Guide and Information Signage in Canada”*. The illumination of overhead guide signs is based upon a number of factors, which are covered in the *“Highway Lighting Guide”* published by Alberta Infrastructure and Transportation.

Ground mounted signs on roadways in Alberta are not typically illuminated, as the retro-reflective sheeting provides enough brightness at night, when illuminated by the headlights of an approaching vehicle.

A4.3.12.2 Backing Materials

The Alberta Infrastructure and Transportation Specification 5.18 - Supply of Permanent Highway Signs, Post and Bases, requires that one of the following materials be used as a sign backing material:

- ½” plywood
- ¾” plywood
- Extruded aluminum
- Two millimetre flat sheet tension leveled sign grade aluminum.

Small signs including route markers and mile post markers will have ½” plywood or flat aluminum. Large ground mounted signs that are greater than one square metre will have ¾” plywood or extruded aluminum. If plywood is used on the large ground mounted signs then “Gerts” or bracing material may be needed to stiffen the plywood surface and provide a suitable mounting support. Overhead guide signs primarily use extruded aluminum. Refer to Drawings TCS-A4-335A and TCS-A4-335B at the end of this section.

A4.3.12.3 Sign Supports

A good sign support system should:

- Fail in a safe, predictable manner if struck.
- Have low material, installation and maintenance costs.

- Be easy to install.
- Be made of readily available material.

Signs, bases and posts should be installed in conformance with Alberta Infrastructure and Transportation typical signage Drawings TCS-A4-310 and TCS-A4-315 and Specification 7.7. Large signs will require an angle iron wind frame as shown in Drawing TCS-A4-320 on wooden posts, or Drawing TCS-A4-325 for steel I-beam posts. Signs shall be attached to wooden posts in accordance with Drawing TCS-A4-330 and to steel breakaway posts in accordance with Drawings TCS-A4-335A and TCS-A4-335B. Extruded aluminum signs shall be assembled as shown in Drawings TCS-A4-335A and TCS-A4-335B. All of the typical signage drawings can be found at the end of this section.

A4.3.13 Signage Design Plans

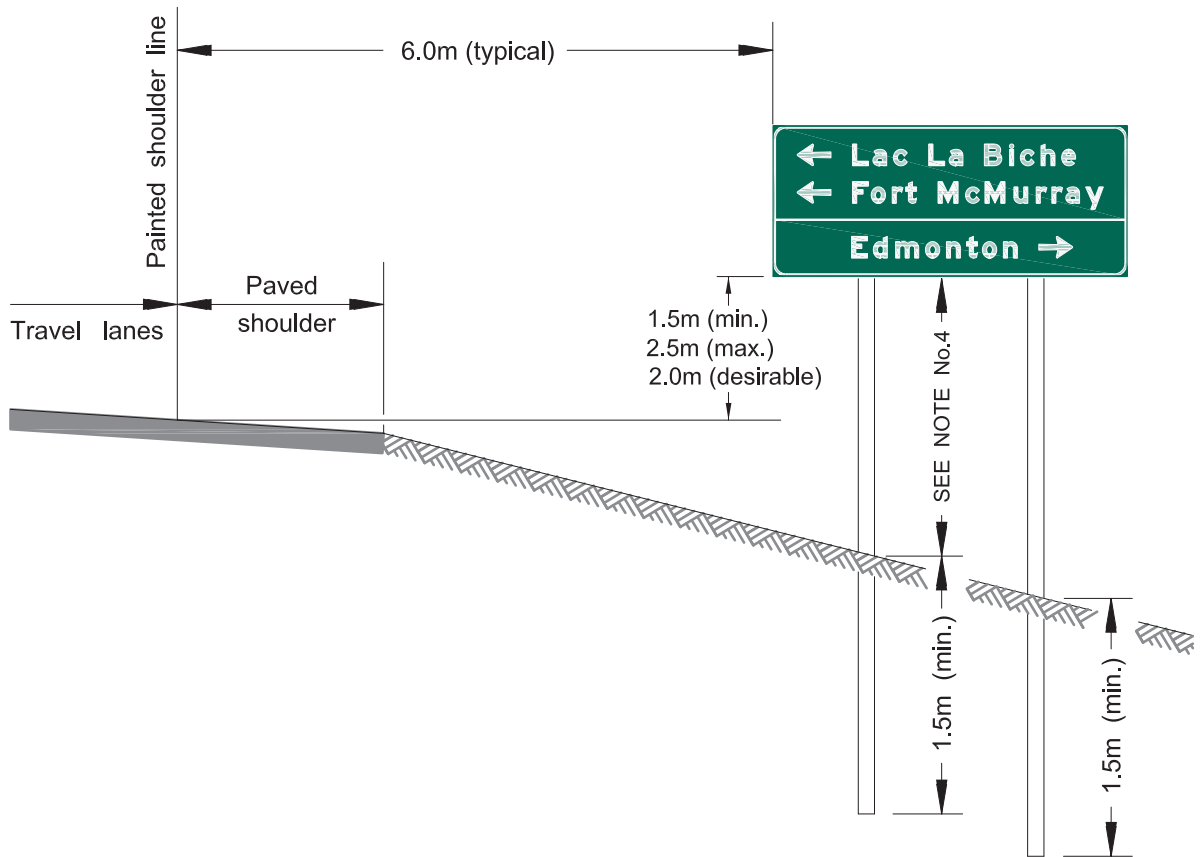
All signs that are placed in a provincial highway right-of-way must be approved by Alberta Infrastructure and Transportation. A signage design plan must be submitted to Alberta Infrastructure and Transportation as part of the design submission package. The design involves selecting the appropriate signs, determining the locations, and estimating quantities and costs.

To obtain approval on sign design from Alberta Infrastructure and Transportation the following needs to be completed and submitted:

- An inventory of the current signs in the highway right-of-way.
- A summary of the signs and materials required for the purposed sign design.
- Sign layout drawing(s). Submissions of proposed sign details may be completed with guide signing software.
- Contract quantities.
- An estimate of the contract and material costs.

For overhead signs, an overhead sign structure that is supporting an overhead sign that is larger than four square metres is treated as a bridge structure. The structural design shall be approved by the Bridge Section of Alberta Infrastructure and Transportation.

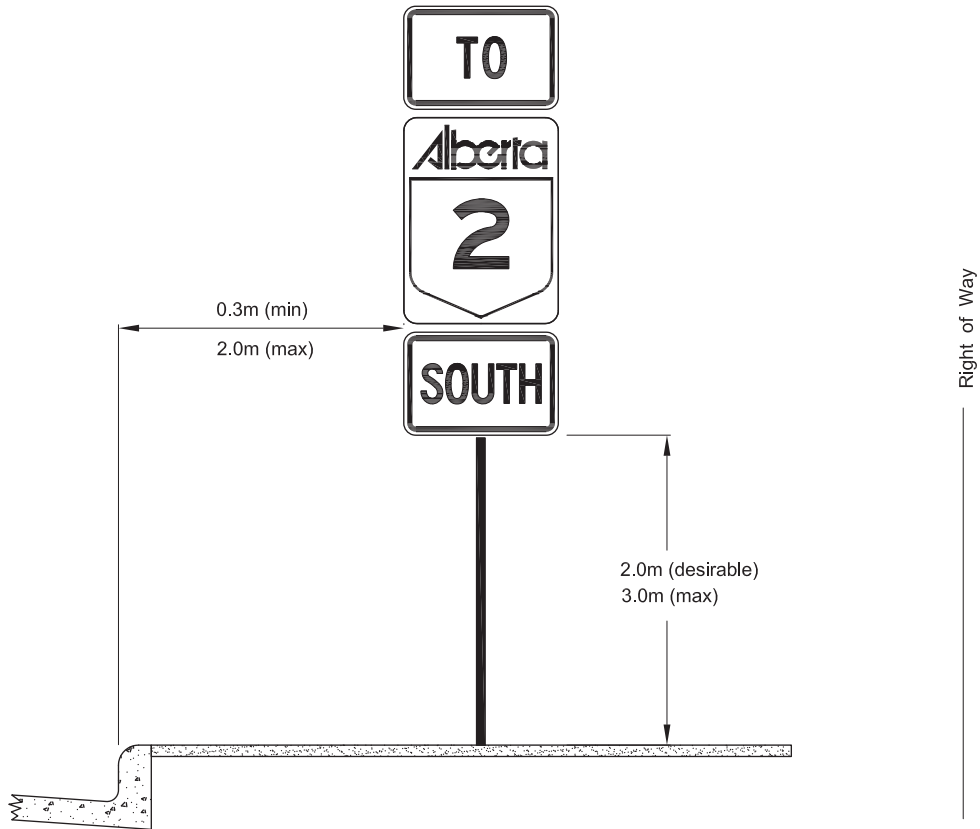
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NOTE:

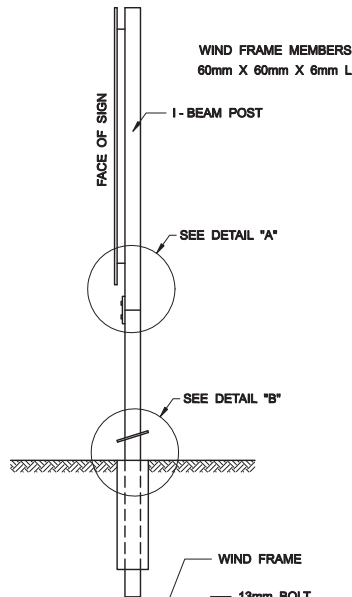
1. All signs to be erected perpendicular to the road and tilted 1°-3° from perpendicular unless otherwise indicated.
2. Single post signs should also be installed to these specifications.
3. This plan shows typical installation only. Offsets may require adjustment for specific situations.
4. 2.2m min. for steel breakaway groundmount posts.

No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-300	
		Date: October 2006	
TYPICAL RURAL SIGN INSTALLATION (Height and Lateral Location)			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4

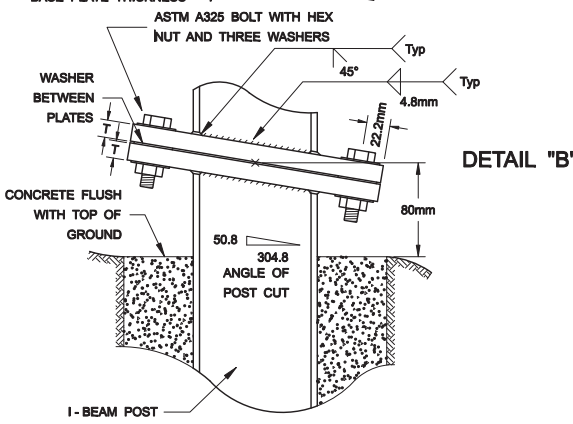
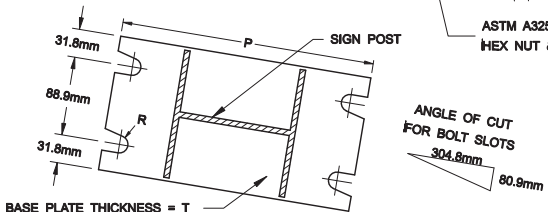
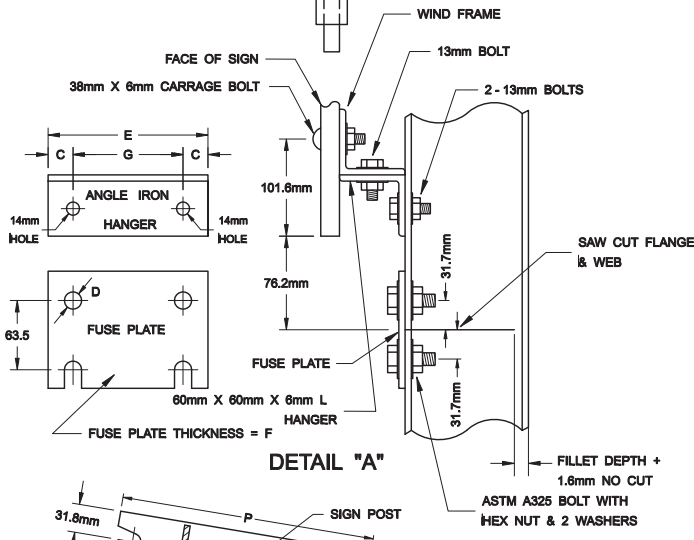
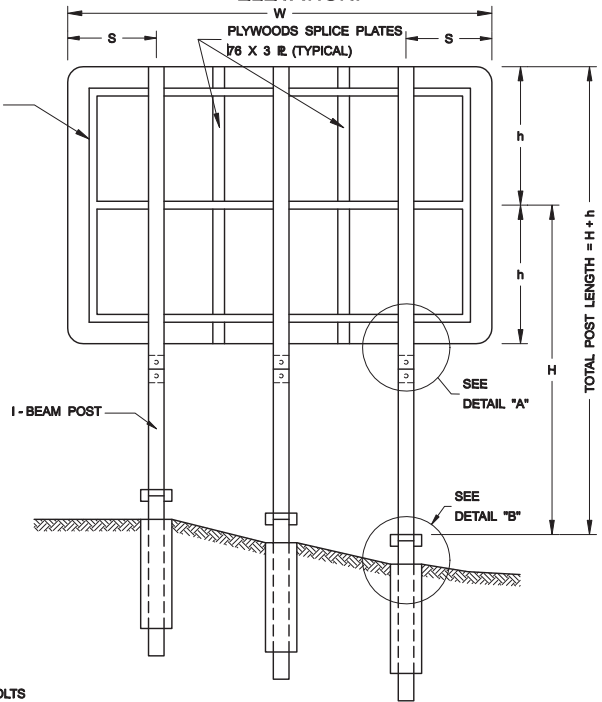


No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-305	
		Date: October 2006	
TYPICAL URBAN SIGN INSTALLATION (Height and Lateral Location)			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4

SIDE VIEW:



ELEVATION:



(H)	POST TYPE			
	W 150x14 (W 6x9)	W 200x15 (W 8x10)	W 150x22 (W 6x15)	W 200x27 (W 8x18)
	½ AREA OF SIGN (W x h) m²			
2.74	6.32	9.66	12.54	
3.05	5.76	8.64	11.24	
3.35	5.20	7.99	10.22	
3.66	4.83	7.25	9.38	13.47
3.96	4.46	6.69	8.64	12.36
4.27	3.99	6.22	8.08	11.43
4.57	3.81	5.76	7.62	10.59
4.88	3.53	5.39	7.15	9.94
5.18	3.34	5.11	6.69	9.29
5.49	3.16	4.83	6.32	8.64
5.79	3.07	4.55	5.95	8.27

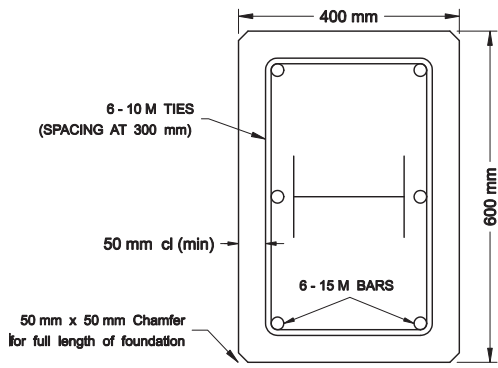
GENERAL NOTES:

1. ALL UNSPECIFIED DIMENSIONS ARE IN mm.
2. PERMANENT HIGHWAY SIGNS WITH SIGN FACE GREATER THAN 3m² SHALL BE INSTALLED WITH BREAKAWAY GROUND MOUNT SIGN SUPPORT ASSEMBLY.
3. S = 20% OF W FOR SIGNS LESS THAN 5.5m.
4. S = 15% OF W FOR SIGNS GREATER THAN 5.5m.
5. SIGNS GREATER THAN 5.5m WIDTH REQUIRE 3 POST MOUNTING.

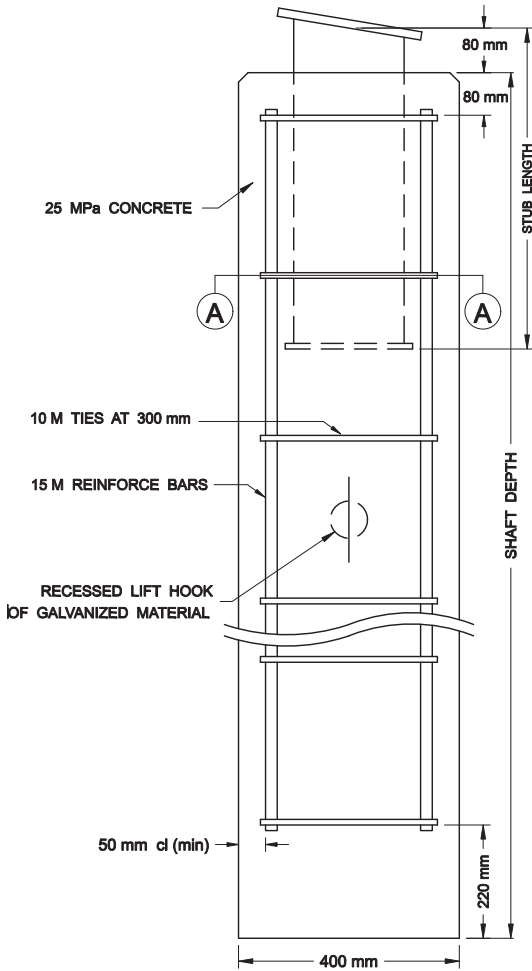
ALL BOLTS SHALL BE TIGHTENED AS FOLLOWS		
BOLT SIZE	TORQUE	RESIDUAL TENSION
13mm (½")	136.9 N.m	5 465.8 kg
16mm (¾")	271.2 N.m	8 709.0 kg
19mm (¾")	482.7 N.m	12 882.0 kg

POST SIZE	BASE CONNECTION DATA				FUSE PLATE & HANGER DATA					
	BOLT SIZE	P	T	R	BOLT SIZE	E	F	G	C	D
W 150x14 (W 6x9)	13	266.7	19.05	7.14	13	101.6	6.35	57.15	22.23	14.29
W 200x15 (W 8x10)	16	317.5	19.05	8.73	16	101.6	6.35	57.15	22.23	17.46
W 150x22 (W 6x15)	16	266.7	25.4	8.73	16	152.4	9.53	88.9	31.75	17.46
W 200x27 (W 8x18)	19	317.5	28.58	10.32	19	133.35	9.53	69.9	31.75	20.64

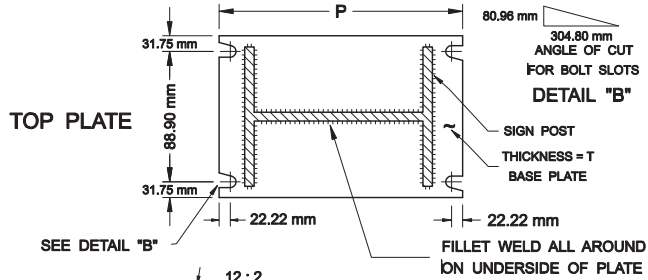
No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-310	
		Date: October 2006	
BREAKAWAY GROUND MOUNTED SIGNS ON I-BEAM POSTS			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4



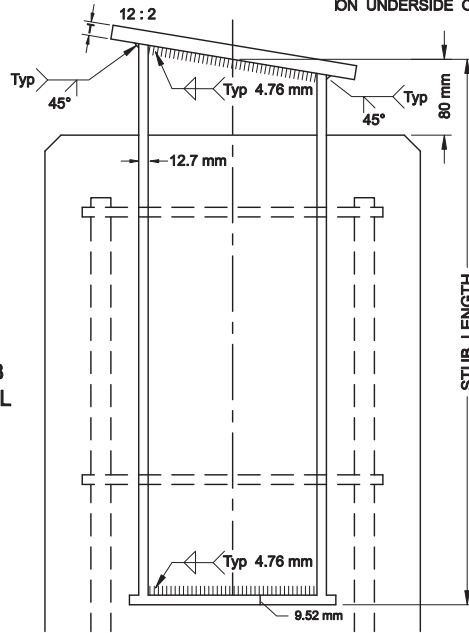
DETAIL A - A



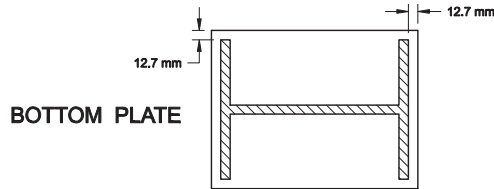
FOUNDATION



TOP PLATE



STUB DETAIL



BOTTOM PLATE

FOUNDATION DATA				
POST SIZE		STUB LENGTH	SHAFT DEPTH	REINF. BARS
METRIC	IMPERIAL			
W150 x 14	W 6x9	600 mm	1800 mm	15 M
W200 x 15	W 8x10	600 mm	1800 mm	15 M
W150 x 22	W 6x15	800 mm	1800 mm	15 M
W200 x 27	W 8x18	800 mm	1800 mm	15 M

BASE CONNECTION DATA					
POST SIZE		BOLT SIZE	P	T	R
METRIC	IMPERIAL				
W150 x 14	W 6x9	13	266.7	19.05	7.14
W200 x 15	W 8x10	16	317.5	19.05	8.73
W150 x 22	W 6x15	16	266.7	25.4	8.73
W200 x 27	W 8x18	19	317.5	28.58	10.32

GENERAL NOTES:

DESIGN

AASHO Specification for Design and Construction of Structural Supports for Highway Signs and National Building Code.

MATERIAL

Structural Steel and Plates shall conform to ASTM Specification A36.

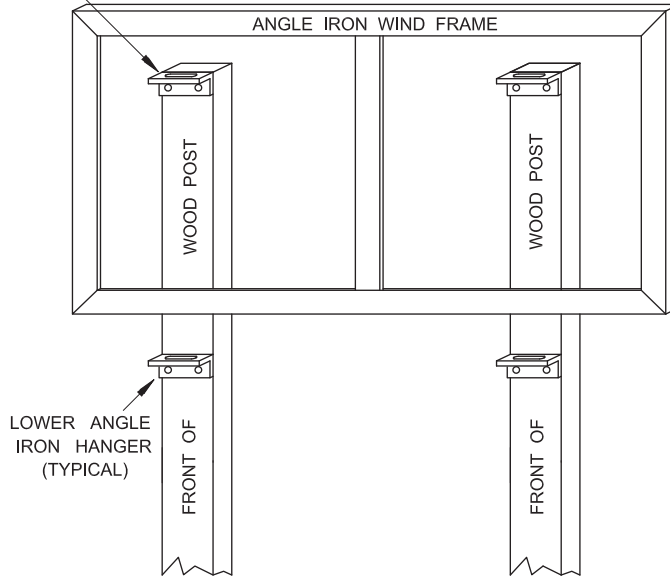
- * All steel shall be Blast Cleaned after fabrication in accordance with Specification SSPC - SP - 6 - 63 of the Steel Structural Painting Council.
- * All welds shall Conform to CSA Specification W - 59.
- * Fabricators shall be approved by the Canadian Welding Bureau.
- * Fabricator shall submit a weld procedure, listing all parameters for approval.
- * Provide weld all around, on both sides, to avoid a zipper failure and provide a safety factor.
- * Welding to be inspected during fabrication, at random, by a qualified inspector.
- * Stubs shall be galvanized and conform to CSA G164.
- * All footings to have a recessed lift hook.

No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-315	
		Date: October 2006	
BREAKAWAY GROUND MOUNTED BASES STEEL I - BEAM POSTS			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4

PICTORIAL OF WINDFRAME AND POST STRUCTURE

UPPER ANGLE
IRON HANGER
(TYPICAL)

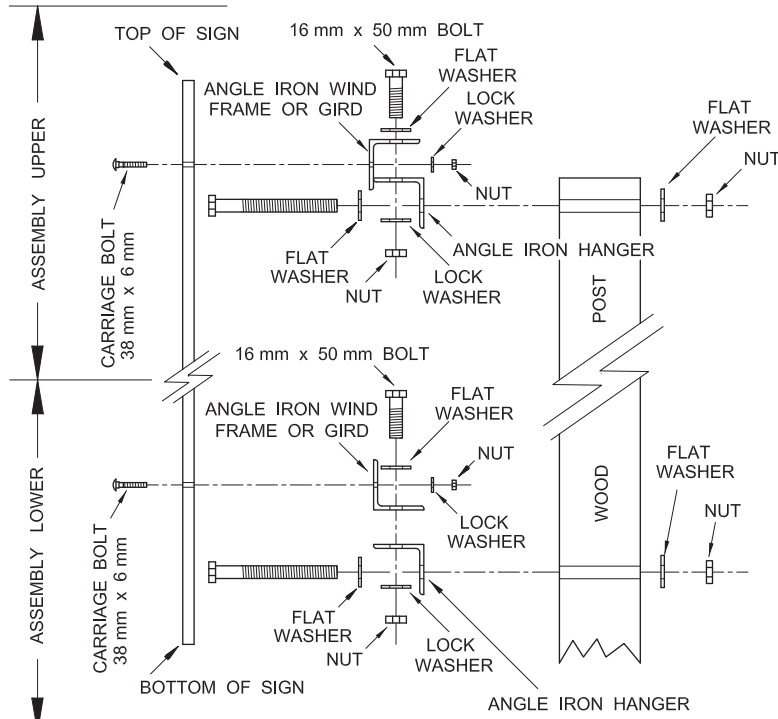
NOTE: WIND FRAME SHOWN ELEVATED ABOVE
ANGLE IRON HANGERS FOR CLARITY.



NOTE:

1. Signs with angle iron girds are mounted similar to wind frames.
2. Wind frames, girds and hangers to be constructed from 60 mm x 60 mm x 6 mm angle iron.
3. All nuts, washers and bolts to be cadmium plated.

SIDE VIEW DETAIL HANGER / BOLT ASSEMBLY

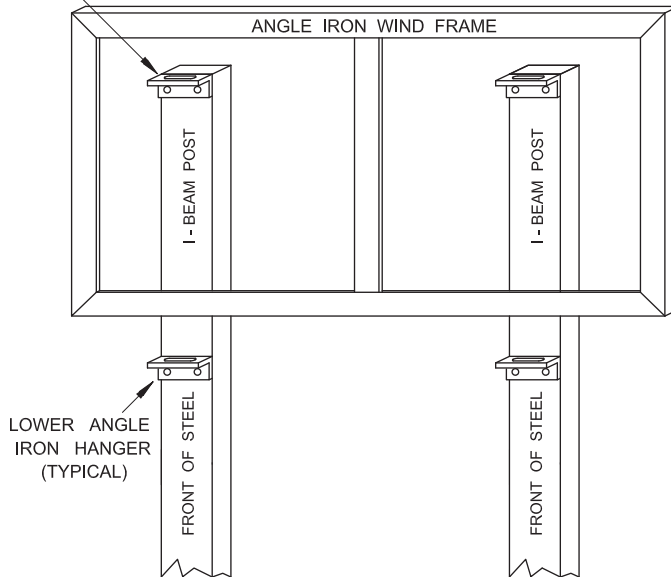


No.	DESCRIPTION	BY	DATE
		DRAWING	
		TCS-A4-320	
		Date: October 2006	
TYPICAL INSTALLATION OF LARGE SIGNS (on Wooden Posts)			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4

PICTORIAL OF WINDFRAME AND POST STRUCTURE

UPPER ANGLE
IRON HANGER
(TYPICAL)

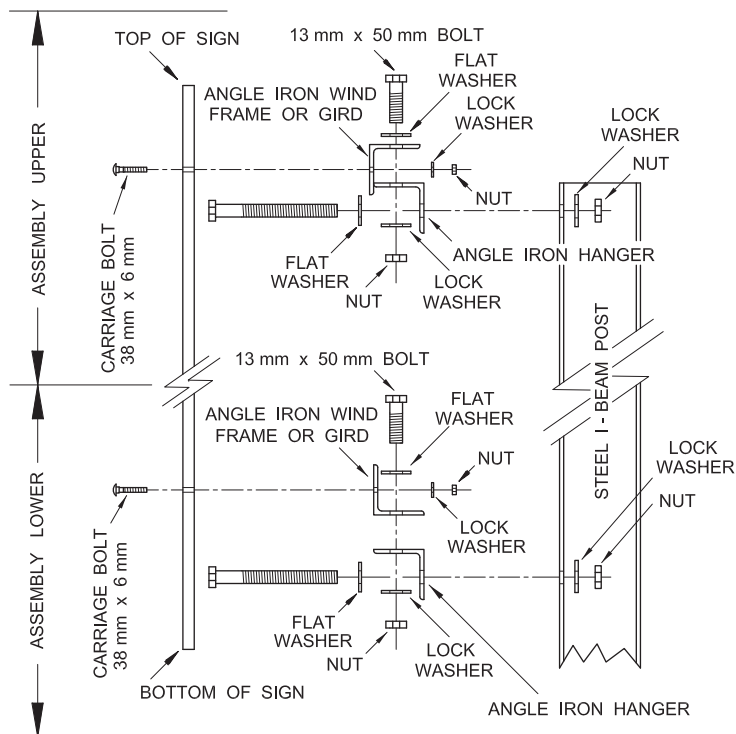
NOTE: WIND FRAME SHOWN ELEVATED ABOVE
ANGLE IRON HANGERS FOR CLARITY.



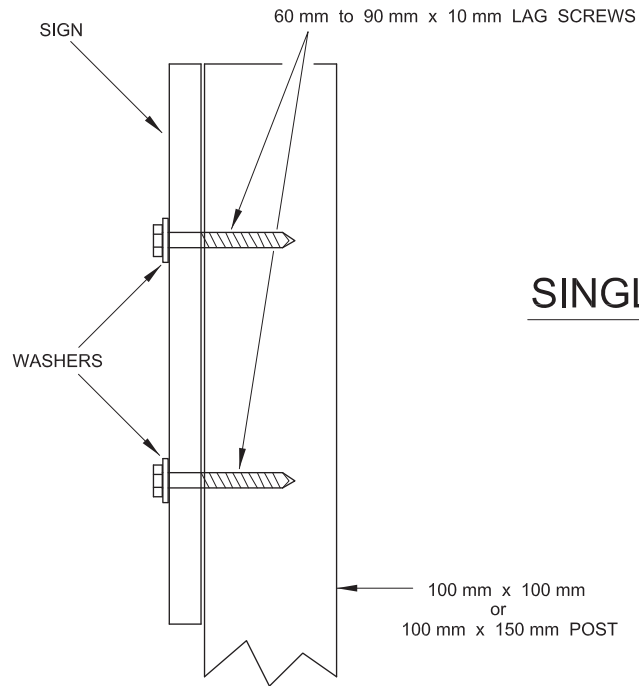
NOTE:

1. Signs with angle iron girds are mounted similar to wind frames.
2. Wind frames, girds and hangers to be constructed from 60 mm x 60 mm x 6 mm angle iron.
3. All nuts, washers and bolts to be cadmium plated.

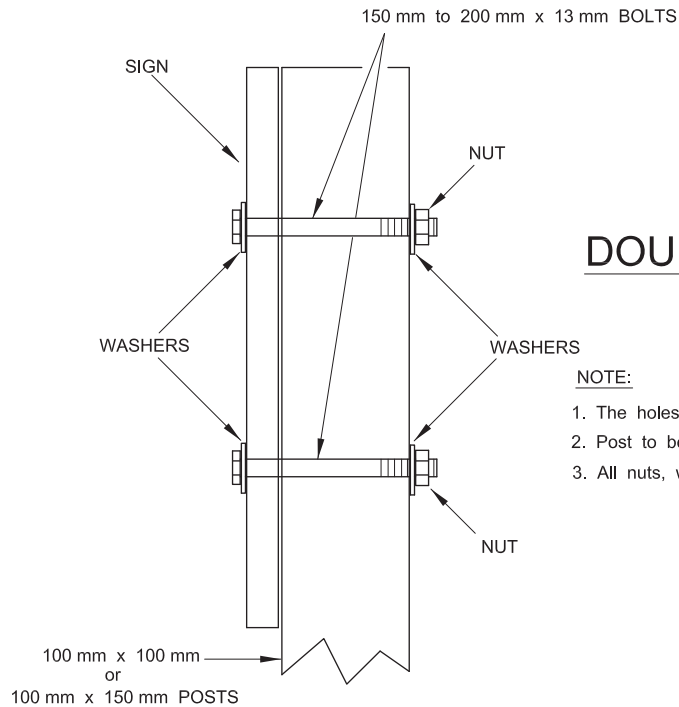
SIDE VIEW DETAIL HANGER / BOLT ASSEMBLY



No.	DESCRIPTION	BY	DATE
		DRAWING	
		TCS-A4-325	
		Date: October 2006	
TYPICAL INSTALLATION OF LARGE SIGNS (on Steel I - Beam Posts)			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4




SINGLE POST SIGN

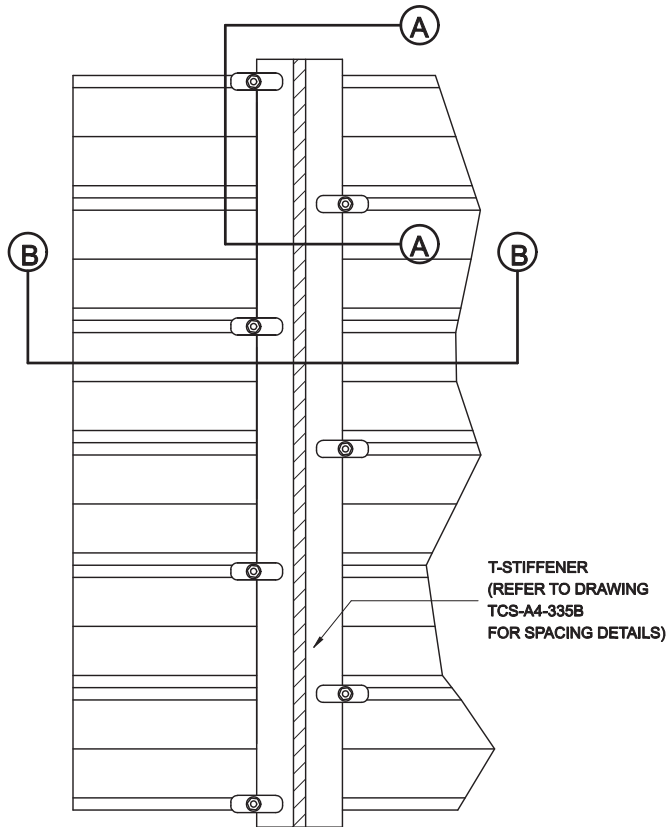


DOUBLE POST SIGN

NOTE:

1. The holes are pre-drilled in the sign.
2. Post to be cut flush with the top of sign and stained.
3. All nuts, washers and bolts to be cadmium plated.

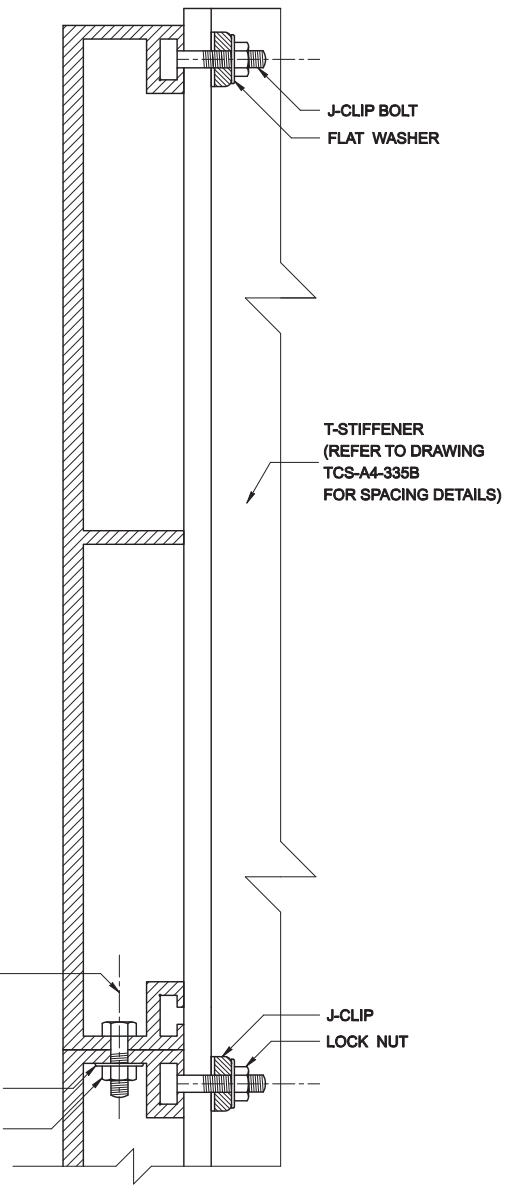
No.	DESCRIPTION	BY	DATE
		DRAWING	
		TCS-A4-330	
		Date: October 2006	
TYPICAL SIGN ASSEMBLY DETAIL			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4



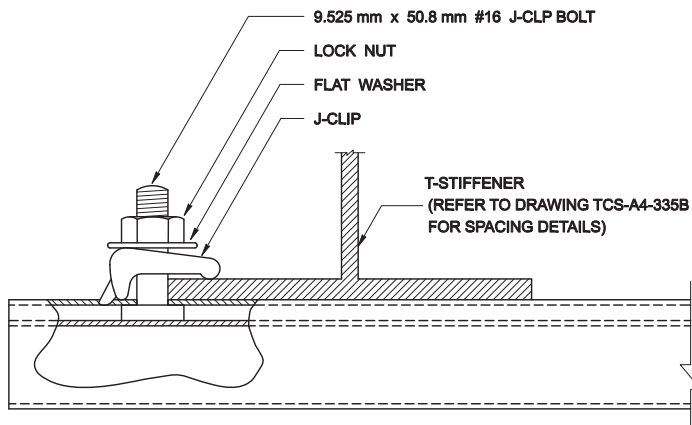
BACK ELEVATION OF SIGN PANEL

NOTES:

1. ALL BOLTS, NUTS AND WASHERS FOR FASTENING EXTRUDED ALUMINUM PANELS TOGETHER SHALL BE STAINLESS STEEL.
2. THE STAINLESS STEEL NUT AND LOCK WASHER OF THE CONNECTING HARDWARE SET MAY BE SUBSTITUTED WITH A STAINLESS STEEL LOCK NUT AND 2 STAINLESS STEEL WASHERS, ONE ON EACH OF THE NUT AND THE HEAD SIDE OF THE BOLT.
3. HORIZONTAL SPACING BETWEEN CONNECTING HARDWARE SETS SHALL BE 457 mm (18") O.C., STAGGERED BETWEEN ROWS OF SLOTS, EXCEPT FOR THE LAST SLOTS AT EITHER END OF THE SECTION OR PANEL.
4. FOR J-CLIPS, ALL BOLTS, NUTS AND WASHERS SHALL BE ALUMINUM ALLOY.
5. J-CLIPS SHALL BE PLACED ON ALTERNATING SIDES OF THE T-STIFFENER FOR EACH PANEL WIDTH.

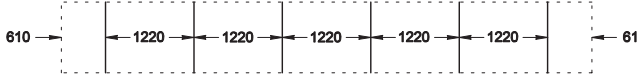

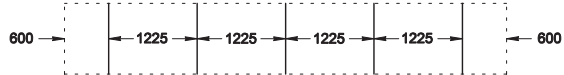
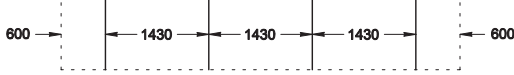
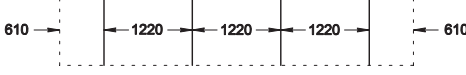
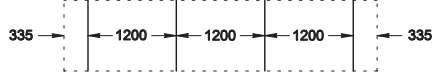
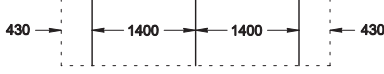
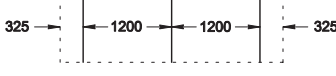
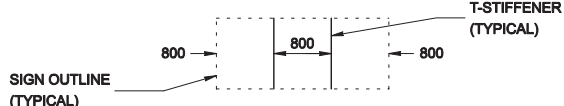


SECTION A - A
INSTALLATION DETAIL




SECTION B - B
INSTALLATION DETAIL

No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-335A	
		Date: October 2006	
SIGN ASSEMBLY FOR EXTRUDED ALUMINUM PANELS			
Prepared By: MM	Checked By: SM	Scale: N.T.S.	SECTION A4

TYPICAL SIGN WIDTH	SPACING OF T-STIFFENERS (SEE NOTE 2)	NUMBER OF VERTICALS
7320 mm (24 ft)		6
6710 mm (22 ft)		5
6100 mm (20 ft)		5
5490 mm (18 ft)		4
4880 mm (16 ft)		4
4270 mm (14 ft)		4
3660 mm (12 ft)		3
3050 mm (10 ft)		3
2440 mm (8 ft)		2

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. T-STIFFENER SPACING FOR WIDER SIGNS WILL BE NOTED IN SPECIAL PROVISIONS.
3. T-STIFFENERS SHALL BE PLACED IN SUCH A WAY THAT THEY ARE SYMMETRICAL ABOUT THE VERTICAL CENTRELINE OF THE SIGN.

No.	DESCRIPTION	BY	DATE
		DRAWING TCS-A4-335B	
		Date: October 2006	
TYPICAL T-STIFFENER SPACING FOR EXTRUDED ALUMINUM PANELS			
Prepared By: SL	Checked By: RC	Scale: N.T.S.	SECTION A4

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